

REMARKS

Prior to the present response, claims 31 and 33-40 were pending in the present application. No claims have been amended, canceled, or added in the present response. Withdrawal of the finality of the present rejection and reconsideration and allowance of pending claims 31 and 33-40 in light of the following remarks are respectfully requested.

A. Rejections of Claims 31, 37, and 39-40 Under 35 USC § 102(e)

The Examiner has rejected claims 31, 37, and 39-40 under 35 USC § 102(e) as being anticipated by US published application number 2003/0207582 to Twu et al. (hereinafter "Twu"). Applicant respectfully submits that independent claim 31 of the present invention is patentably distinguishable over Twu for the reasons that follow.

The present invention, as defined by independent claim 31 is directed to, among other things, reducing dishing in metal features during CMP process. The present invention, as defined by independent claim 31 requires that, after passage of a first time period, the flow rate of the slurry during a second time period be reduced and in fact be stopped so that during the second time period only a polishing action, with no slurry flow, would occur. As such, independent claim 31 requires "reducing said dispensing of said slurry after said polishing for a first period of time, wherein said dispensing of said slurry is reduced to a stop" followed by "polishing said sample using said polishing pad for a second period of time to remove said excess interconnect material."

In contrast, Twu is directed to "saving on the amount of slurry that is being used for the copper surface polishing process" and reducing damage to copper lines by using a "low to high" slurry flow. See, for example, paragraph 52 of Twu. This is in contrast with the methods and the goals of the present invention. As stated in Twu, the polishing process of Twu is broken down into two distinct steps. The first step is a slow slurry flow, that is less than or equal to 200 cc/min. This polishing step is executed for a time approximately equal to 5 minutes and is determined by the thickness of the layer of copper that needs to be polished. This polishing process and the time of duration for this process assumes the use of standard copper slurry. The second step of the polishing process is a high slurry flow, that is more than or equal to 250 cc/min. This polishing step is executed for a time approximately equal to 1 to 2 minutes and is again determined by the thickness of the layer of copper that needs to be polished. This polishing process and the time of duration for this process also assumes the use of standard copper slurry. See, for example, paragraphs 42 through 44, and Figure 5a of Twu.

As stated above, the present invention, as defined by independent claim 31, requires just the opposite; for example, that a high flow rate be reduced, and indeed be stopped - at which time only polishing is performed. On page 6, lines 1-2, of the final rejection, the Examiner has stated that: "In [0039], Twu teaches pulsing of the slurry, which inherently means that the dispensing of the slurry is reduced to a stop at a point in time." Applicant has carefully reviewed paragraph 0039 and the remaining disclosure of Twu; and it is submitted that Twu in fact teaches the opposite of the present invention, in

that Twu teaches that the slurry flow *never* stops. As such, Twu teaches away from the present invention, as defined by independent claim 31. Paragraph 0039 of Twu, relied upon by the Examiner, is quoted below in its entirety:

"[0039] The indicated slurry rates can readily be extended to slurry rates that have a pattern of slurry release that is unique and well defined for a particular slurry distribution system. *The slurry distribution can, for instance, be provided in multiple steps of slurry pressure increase after which the slurry pressure rapidly decreases (in one step or in multiple steps) to its original value after which the multiple step increase in distributed slurry pressure is again initiated. Another pattern of slurry distribution can be a pattern whereby the slurry pressure pulsates between a high and a low value, the rate of pulsation can thereby also be varied and be one of the parameters that optimizes slurry distribution and subsequent polishing results. Yet another scheme of adjusting the slurry pressure is to gradually and as a linear function of time increase the slurry pressure, reset the slurry pressure to its initial value after this pressure has reached a high pressure threshold and restart the gradual increase in slurry pressure.*" (emphases added).

Thus, Twu in fact teaches three different methods for adjusting "slurry pressure," none of which even suggests a total stop of the slurry followed by a separate step of

polishing with no slurry. As such, Applicant respectfully submits that the present invention, as defined by independent claim 31, is patentably distinguishable over Twu, and thus claims 33-40 depending from independent claim 31 are also patentable over Twu.

B. Rejections of Claims 33-36 and 38 Under 35 USC § 103(a)

The Examiner has separately rejected dependent claims 33-36 and 38 under 35 USC §103(a) as being unpatentable over Twu in view of US patent number 5,441,598 to Yu et al. (hereinafter "Yu"). It is noted that Yu has been relied upon by the Examiner to teach "creating pits of various shapes and sizes in the polishing pad used for CMP processing." The Examiner has continued by stating that Yu's method "imparts an increased control over polishing characteristics." Applicant submits that Yu has been cited as a reference only against the dependent claims 33-36 and 38. As recognized by the Examiner, Yu contains no teachings regarding the novel features of the invention as claimed by independent claim 31, such as requiring "reducing said dispensing of said slurry after said polishing for a first period of time, wherein said dispensing of said slurry is reduced to a stop" followed by "polishing said sample using said polishing pad for a second period of time to remove said excess interconnect material." Thus, Applicant respectfully submits that the present invention, as defined by independent claim 31 and claims 33-40 depending from independent claim 31, is also patentable over any combination of Yu with Twu, for the reasons discussed above.

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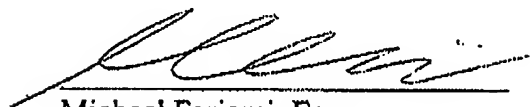
C. Conclusion

For the foregoing reasons, Applicant respectfully submits that claim 31 and its dependent claims 33-40 are patentable over the art of record and the withdrawal of the finality of the present rejection and an early notice of allowance directed to claims 31 and 33-40 remaining in the present application are respectfully requested.

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Respectfully Submitted,
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